

Amendments to the Claims

1. (currently amended) A method for the dissolution and purification of tantalum concentrates, comprising: (a) combining forming a slurry of a tantalum concentrate containing at least one of (Fe,Mn)(Ta,Nb)₂O₆, (Fe,Mn,Mg)(Nb,Ta)₂O₆, (Ca,Na)₂Ta₂O₆(O,OH,F) and NaTaO₃, a fluoride-containing compound, and sulfuric acid to cause an exothermic reaction, to form a solution containing tantalum values and impurities; the fluoride-containing compound being selected from NH₄HF₂, NaF, KF, CaF₂, or a combination thereof; (b) separating liquid from the slurry to obtain a solution containing tantalum values and impurities; and (b)(c) separating the tantalum values from the impurities by solvent extraction.
2. (original) The method of claim 1 wherein the fluoride-containing compound is ammonium bifluoride.
3. (original) The method of claim 1 wherein the solvent extraction comprises contacting the solution containing the tantalum values and impurities with an organic phase whereby at least a portion of the tantalum values in the solution are extracted into the organic phase, separating the organic phase from the solution, and contacting the organic phase with an aqueous medium to extract at least a portion of the tantalum values from the organic phase into the aqueous medium.
4. (original) The method of claim 3 wherein the organic phase is methyl iso-butyl ketone.
5. (original) The method of claim 4 wherein the fluoride-containing compound is ammonium bifluoride.
6. (original) The method of claim 3 wherein the tantalum values are precipitated from the aqueous medium by adding ammonium hydroxide.
7. (original) The method of claim 5 wherein the tantalum values are precipitated from the aqueous medium by adding ammonium hydroxide.

8. (original) The method of claim 1 wherein greater than 90% of the tantalum values in the tantalum concentrate are dissolved into the solution.

9. (original) The method of claim 2 wherein greater than 90% of the tantalum values in the tantalum concentrate are dissolved into the solution.

10. (currently amended) A method for the dissolution and purification of tantalum concentrates, comprising: (a) combining forming a slurry of a tantalum concentrate containing at least one of (Fe,Mn)(Ta,Nb)₂O₆, (Fe,Mn,Mg)(Nb,Ta)₂O₆, (Ca,Na)₂Ta₂O₆(O,OH,F) and NaTaO₃, a fluoride-containing compound, and sulfuric acid to cause an exothermic reaction, form a solution containing tantalum values and impurities; the fluoride-containing compound being selected from NH₄HF₂, NaF, KF, CaF₂, or a combination thereof; (b) adding water to the slurry and extracting liquid from the slurry to obtain a solution containing tantalum values and impurities; (b)(c) contacting the solution with an organic phase comprising methyl iso-butyl ketone whereby at least a portion of the tantalum values in the solution are extracted into the organic phase, (e)(d) separating the organic phase from the solution, (d)(e) contacting the organic phase with water whereby at least a portion of the tantalum values in the organic phase are extracted into an aqueous medium, and (d)(f) precipitating a tantalum compound from the aqueous medium.

11. (original) The method of claim 10 wherein the fluoride-containing compound is ammonium bifluoride.

12. (original) The method of claim 11 wherein greater than 90% of the tantalum values in the tantalum concentrate are dissolved into the solution.